

REMARKS

Claims 11-20 are pending in the application in view of the Preliminary Amendment filed on June 24, 2005.

Claims 1-14, 16 and 18-20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Obreja et al., *Preparation and Properties of Electrodeposited InSe and CuSe Thin Films*, National Institute for Research and Development in Micotechnology, University of Bucharest, Romania, 1998, pp. 233-236 (hereinafter "Obreja") in view of United States Patent 6,607,653 to Tsuji et al. (hereinafter "Tsuji") Claim 17 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Obreja and Tsuji as applied to claims 1-14, 16 and 18-20 above and further in view of United States Patent 4,980,035 to Emmenegger (hereinafter "Emmenegger"). Claims 11 and 15-18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Obreja as applied to claims 1-14, 16 and 18-20 above and in view of United States Patent 3,460,983 to Schwartz et al. (hereinafter "Schrawtz"). Claims 11 and 15-18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Obreja as applied to claims 1-14, 16 and 18-20 above and in view of United States Patent 5,534,128 to Aso (hereinafter "Aso")

As provided above, Applicants canceled claims 1-10 in the Preliminary Amendment filed June 24, 2005. As a result, the rejections of claims 1-10 herein are moot. Applicants respectfully request reconsideration of the present application in view of the following remarks.

Claims 11-14, 16 and 18-20 and 35 U.S.C. § 103(a)

The rejection of claims 11-14, 16 and 18-20 under 35 U.S.C. § 103(a) as being unpatentable over Obreja in view of Tsuji is respectfully traversed. To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

The combination of Obreja and Tsuji does not teach or suggest all the limitations of claim 11. The combination of Obreja and Tsuji, for example, does not teach a method of producing a I-III-VI ternary compound in thin film form, wherein the electrolysis bath comprises at least one surfactant to promote incorporation of a group III element into the film.

In its introduction, Obreja recognizes that I-III-VI ternary compounds, such as CuInSe_2 and CuInS_2 , can be produced by electrodeposition.¹ However, Obreja fails to teach or suggest the use of at least one surfactant in the electrolysis bath to promote incorporation of a group III element into the I-III-VI film. The remaining disclosure of Obreja addresses the formation of binary Cu_xSe and InSe films and is silent regarding I-III-VI ternary compounds. Obreja, for example, recites:

In order to improve the control of stoichiometry and to a better understanding of the semiconductor electrodeposition, an alternative process has been studied. In this paper we present our experiments on sequential deposition and characterization of Cu_xSe and InSe films.²

In view of this recitation, any additives incorporated in the electrolysis bath of Obreja is done in the context of controlling the stoichiometry of binary Cu_xSe and InSe films. As a result, Obreja is incapable of teaching or suggesting the inclusion of a surfactant in an electrolysis bath to promote the incorporation of a group III element into a I-III-VI ternary compound.

Moreover, the disclosure of Tsuji does not cure the deficiencies of Obreja. Tsuji addresses tin-copper metallic alloy plating. As a result, Tsuji does not even disclose group III elements. Furthermore, metallic alloy plating is fundamentally divergent from the production of I-III-VI semiconductor films. In view of these differences, Tsuji fails to teach use of a surfactant in a electrolysis bath to promote the incorporation of a group III element into a I-III-VI ternary compound.

Additionally, “we have noted...as a useful general rule, that references that teach away cannot serve to create a prima facie case of obviousness...A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” *In re Gurley*, 27 F.3d 551, 31 USPQ2d 1130 (Fed. Cir. 1994).

¹ Obreja, Introduction, page 233.

² *Id.* at pages 233-234.

Obreja's disclosure of binary compounds leads one of skill in the art away from ternary I-III-VI compounds while Tsuji's disclosure of metallic alloys leads one of skill in the art away from I-III-VI semiconductor compounds.

In view of the forgoing, Applicants respectfully assert that claim 11 is patentable over the combination of Obreja and Tsuji and respectfully request that the present rejection be withdrawn. As claims 12-14, 16 and 18-20 depend from and further limit claim 11, Applicants respectfully assert claims 12-14, 16 and 18-20 are also patentable over the combination of Obreja and Tsuji and respectfully request that the rejection of these claims be withdrawn as well.

Claim 17 and 35 U.S.C. § 103(a)

The rejection of claim 17 under 35 U.S.C. § 103(a) as being unpatentable over Obreja in view of Tsuji and further in view of Emmenegger is respectfully traversed.

For reasons consistent with those provided in the discussion of claims 11-14, 16 and 18-20 above, the combination of Obreja and Tsuji does not render claim 11 unpatentable under 35 U.S.C. § 103(a).

Moreover, Emmenegger does not cure the deficiencies of the combination of Obreja and Tsuji. Emmenegger describes the electrolytic deposition of metal alloys of gold, copper and zinc (Au-Cu-Zn). In describing metal alloy deposition, Emmenegger provides no teaching relevant to I-III-VI semiconductor films. Disclosure of metal alloy deposition actually teaches away from semiconductor films.

As a result, Applicants respectfully assert the combination of Obreja, Tsuji and Emmenegger does not render claim 11 unpatentable. As claim 17 depends from and further limits claim 11, Applicants respectfully assert claim 17 is also patentable over the combination of Obreja, Tsuji and Emmenegger and respectfully request that the present rejection be withdrawn.

Claims 11 and 15-18 and 35 U.S.C. § 103(a)

The rejection of claims 11 and 15-18 under 35 U.S.C. § 103(a) as being unpatentable over Obreja in view of Schwartz is respectfully traversed.

For reasons consistent with those provided in the discussion of claims 11-14, 16 and 18-20 above, Obreja does not render claim 11 unpatentable under 35 U.S.C. § 103(a).

Moreover, Schwartz does not cure the deficiencies of Obreja. Schwartz describes the electrolytic deposition of metal alloys of copper, nickel and tin (Cu-Ni-Sn). In describing metal alloy deposition, Schwartz provides no teaching relevant to I-III-VI semiconductor films. Disclosure of metal alloy deposition actually teaches away from semiconductor films.

As a result, Applicants respectfully assert that the combination of Obreja and Schwartz does not render claim 11 unpatentable and respectfully request that the present rejection be withdrawn. As claims 15-18 depend from and further limit claim 11, Applicants respectfully assert claims 15-18 are also patentable over the combination of Obreja and Schwartz and respectfully request the rejection of these claims be withdrawn as well.

Claims 11 and 15-18 and 35 U.S.C. §103(a)

The rejection of claims 11 and 15-18 under 35 U.S.C. § 103(a) as being unpatentable over Obreja in view of Aso is respectfully traversed.

For reasons consistent with those provided in the discussion of claims 11-14, 16 and 18-20 above, Obreja does not render claim 11 unpatentable under 35 U.S.C. § 103(a).

Moreover, Aso does not cure the deficiencies of Obreja. Aso describes the electrolytic deposition of metal alloys of copper, zinc and carbon for copper foil printed wiring board applications. In describing metal alloy deposition, Aso provides no teaching relevant to I-III-VI semiconductor films. Disclosure of metal alloy deposition for printed wire board applications actually teaches away from semiconductor films.

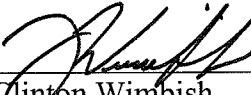
As a result, Applicants respectfully assert that the combination of Obreja and Aso does not render claim 11 unpatentable and respectfully request that the present rejection be withdrawn. As claims 15-18 depend from and further limit claim 11, Applicants respectfully assert claims 15-18 are also patentable over the combination of Obreja and Aso and respectfully request that the rejection of these claims be withdrawn as well.

CONCLUSION

In view of the foregoing, a favorable Office Action is respectfully solicited. The Examiner is respectfully invited to contact J. Clinton Wimbish at 704.338.5021 to discuss any matter related to the present application.

Respectfully submitted,

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Date


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